

### REMARKS

Reconsideration of the present application is respectfully requested in view of the above amendments and the following remarks. Claims 1-16 are pending in the application; claims 12, and 14-15 are withdrawn and claims 1-11 and 16 are currently under examination. Applicants kindly thank the Examiner for acknowledging the allowable subject matter in claims 6, 8-11, and 16. Without acquiescence to the rejections, and without prejudice to pursuing the encompassed subject matter in a related divisional, continuation, or continuation-in-part application, claims 1, and 4-5 are amended to more particularly point out and distinctly claim certain aspects of Applicants' invention. No new matter has been added by the amendments. Support for the amendments can be found in the specification as originally filed, for example, at page 4, lines 7-8; and page 4, lines 19-20.

### **REJECTIONS UNDER 35 U.S.C. § 112, SECOND PARAGRAPH, INDEFINITENESS**

The Examiner rejected claims 4 and 5 under 35 U.S.C. § 112, second paragraph, for alleged indefiniteness. The Examiner asserts that the recitation "capable of" is vague.

Applicants traverse this rejection and submit that the instant claims satisfy the requirements of definiteness. Nonetheless, without acquiescence, claims 4 and 5 as amended recite "wherein the surface chemical moiety forms a covalent bond," rendering moot this rejection.

Applicants submit that the instant claims satisfy the requirements of definiteness under 35 U.S.C. § 112, second paragraph, and respectfully request withdrawal of this rejection.

### **REJECTIONS UNDER 35 U.S.C § 102**

The Examiner rejected claims 1-4 and 7 under 35 U.S.C. § 102(e) for alleged lack of novelty over *Mirkin et al.* (U.S. Patent No. 6,812,334). The Examiner asserts that *Mirkin et al.* disclose oligonucleotides attached to an amine-functionalized microsphere by means of a diisothiocyanate coupling to yield a dithiourea linkage, which in combination with the illustration in Figure 12D allegedly reads on a solid phase comprising a surface first chemical moiety which participates in covalent bonding with a second chemical moiety conjugated to a tag

oligonucleotide which is partially double stranded with a second tag to provide a 3' portion. The Examiner then states that it is not clear how the method of employing the tag oligonucleotide as a substrate for ligase-mediated covalent bonding to a target molecule makes the final product different from the product of Mirkin *et al.*

Applicants traverse this rejection and submit that the instant claims satisfy the requirements of novelty over Mirkin *et al.* In particular, Applicants note that in order to anticipate the claims, the claimed subject matter must be disclosed in the reference with 'sufficient specificity' to constitute an anticipation under the statute. M.P.E.P. § 2131.03 (*emphasis added*). It is not enough to disclose all the claim elements, rather "[t]he identical invention must be *arranged* as required by the claim..." *Id.* (without internal citations) (*emphasis added*). Here, Mirkin *et al.* fail to disclose with sufficient specificity a solid phase bound tag oligonucleotide rendered partially double stranded by annealing an  $\alpha$ -tag oligonucleotide to the tag oligonucleotide to provide a 3' overhang, wherein a target nucleic acid molecule is ligated to the 3' end of the tag oligonucleotide.

Mirkin *et al.* fail to disclose each feature of the instant claims. In particular, Mirkin *et al.* fail to disclose a solid phase having a structure as presently claimed, since the oligonucleotide probes on the surface of the claimed solid phase are modified to give a new covalently bound, immobilized target nucleic acid molecule sequence on the surface. Specifically, the 3' end of the tag oligonucleotide is modified in such a way as to allow the introduction of a new target nucleic acid molecule to the end of the immobilized oligonucleotide by ligation, such as wherein the "the target nucleic acid molecule is ligated to the tag oligonucleotide," as recited in the instant claims. In this regard, aspects of the present invention utilize solid phase bound nucleic acids in such a way as to build new sequences on the solid phase, *i.e.*, new structural information that is aligned in a specific orientation, thereby changing the structural features of the solid phase surface itself.

In contrast to the instant claims, none of the solid phase particles described by Mirkin *et al.* comprise an oligonucleotide probe that is modified to give a new covalently bound, immobilized target nucleic acid molecule sequence on the surface. Indeed, the 3' overhang of Mirkin *et al.*, referred to by the Examiner at page 3 of the Action, merely allows transient

interactions between the immobilized DNA and the binding oligonucleotide, or target nucleic acid, as the latter may be removed by heat or denaturation. In this regard, any target nucleic acid of Mirkin *et al.*, at best, interacts with the immobilized DNA by hybridization. As noted above, however, the 3' overhang of the instant invention is constructed to allow covalent ligation of a target nucleic acid to the end of the immobilized tag oligonucleotide, thereby conveying new structural information in a specific orientation.

Hence, Applicants respectfully submit that the Examiner is misapplying Mirkin *et al.* because, among other differences, this reference merely describes a system having a specifically oriented double-stranded nucleic acid at the surface of the solid phase, in which the sequence of the target nucleic acid would be oriented with the 5' end opposite the solid phase. In contrast, the present invention results in a single-stranded target nucleic acid that is covalently bound to the solid phase in a different orientation, such that the sequence of the target nucleic acid is oriented with the 3' end opposite the solid phase, which, in effect, provides a solid phase with a new surface. Given the structural differences described herein and recited in the instant claims, Applicants submit that Mirkin *et al.* fail to describe the presently claimed solid phase with sufficient specificity to be anticipatory under section 102.

Applicant submits that the instant claims satisfy the requirements of novelty over Mirkin *et al.*, and respectfully request withdrawal of this rejection under 35 U.S.C. § 102(e).

Applicants believe that all of the claims in the application are allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

Respectfully submitted,  
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